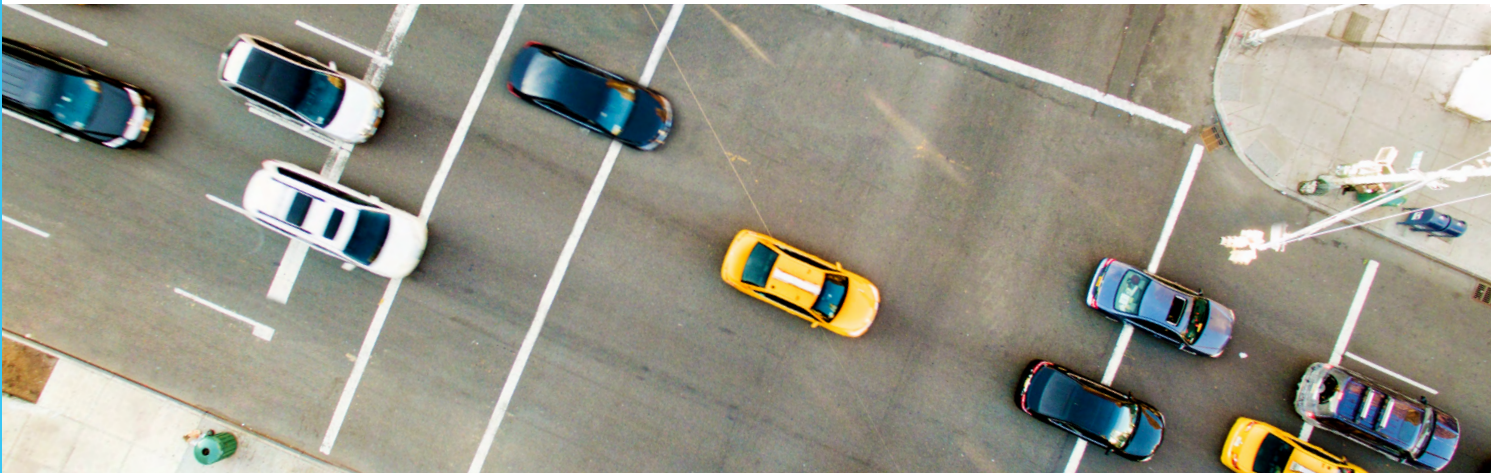


Modern Departments of Transportation utilize sensors and edge computing to Acquire, Analyze and Act on data



Making it easier, more cost effective and safer for people to navigate our nation's roadways is a key concern for the modern department of transportation.

Evolving technology has always played an important role in transportation from the days the first Model Ts rolled off the factory line to today's self-driving vehicles. Today, smart sensors are helping transform the way public agencies monitor, evaluate, and manage transportation systems. Embedded in everything from vehicles to traffic lights, these sensors play a pivotal role in enhancing the efficiency and safety of publicly maintained roads and transportation systems.

Challenge: Collecting and managing huge data volumes

The proliferation of smart sensors potentially transforms the way transportation agencies monitor and manage our roadways. Smart sensors are making their way into all aspects of the transportation matrix from self-driving cars and onboard GPS systems to bridges, roadways, traffic signals, bus stops and rail stations. Local and federal agencies can rely on sensor data to improve safety and efficiency of the nation's transportation systems.

To achieve this, certain challenges must be addressed. Millions of vehicles utilizing the roadways each day generate useful data about traffic patterns, current road conditions and more. Sensors embedded in cars and trucks alert when a vehicle needs maintenance. Self-driving cars use sensors to maintain their position in the lane and avoid pedestrians and other hazards on the road. Onboard GPS systems employ sensors for navigation. Sensors at bus stops and train stations keep commuters updated on delays. And sensors in

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traffic signals, on highway overpasses and bridges and at rail crossings provide constant feedback on road conditions. Much of that data can provide valuable insights into transportation needs if the sheer volume can be handled.

However, the sensors are useless without the larger system that collects and makes use of their data. Architecting that system is no trivial task. The data volumes involved are massive. Road conditions can change quickly, requiring fast analysis of sensor data so travelers, road crews and even first responders can be notified of dangerous situations. Agencies must find new ways of acquiring, analyzing, and acting on the data from these sensors.

Solution: Edge computing drives data acquisition, analysis, and action

Edge computing and network storage deliver the ability to provide compute and storage close to the digital interaction. Algorithms that live out on the edge can quickly analyze sensor data and provide real-time updates, such as reporting accidents or traffic delays and notifying drivers of road closures and providing detours around hazards.

Lumen operates over 40 edge computing sites across the nation. By moving key applications to the edge, latency can be reduced to improve the response times to any changes in traffic conditions. Because Lumen works with the major cloud providers, these edge facilities can stay in synch with cloud resources while improving application performance. Artificial intelligence (AI) engines in the cloud can design algorithms that can be moved out to the edge where they can quickly act on data streams from the embedded sensors.

Edge computing moves monitoring applications closer to where endpoints reside, reducing latency and policing access before significant resources can be compromised. Because transportation literally has many moving parts, Lumen's edge compute infrastructure provides facilities where partners can deploy their technologies closer to customers, providing a tailored solution for public sector needs.

Results: Security and data flexibility for researchers

Utilizing edge computing with smart sensors embedded in public sector transportation systems allows data to be analyzed close to the source, improving response times and reducing the amount that must be transmitted across the network. Consider just a few benefits:

- Safer roadways with real-time notifications of changing road conditions
- Faster response to accidents and road closures
- Reduction in the number of hours commuters spend sitting in traffic

Edge-based computing is a key part of the foundational infrastructure for the modern department of transportation.

Visit lumen.com/edgecomputing for more information.